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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/690,835	10/21/2003	Subbareddy Kanagasabapathy	52069	5411
21874	7590	06/03/2004	EXAMINER	
EDWARDS & ANGELL, LLP			LEE, SIN J	
P.O. BOX 55874			ART UNIT	
BOSTON, MA 02205			PAPER NUMBER	
			1752	

DATE MAILED: 06/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/690,835

Applicant(s)

KANAGASABAPATHY ET AL.

Examiner

Sin J. Lee

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 October 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9, 11-14 and 17-20 is/are rejected.
- 7) ☒ Claim(s) 10, 15 and 16 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>03262004</u> . | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 9, 13, 14, and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Kawabe et al (JP 11-327145, its DERWENT English abstract, and its machine-assisted English translation provided by Japan Patent Office).

Kawabe teaches a positive photosensitive resin composition containing a polymer having an acid-decomposable group, an acid-generating compound, a compound having a *sulfonamide* structure, and one or more of fluorine and *silicon* type surfactants. See DERWENT abstract. Kawabe teaches (see [0051] of the machine English translation) a *polysiloxane polymer* as an example of the silicon type surfactant. Therefore, the prior art teaches present inventions of claims 1, 9, and 14.

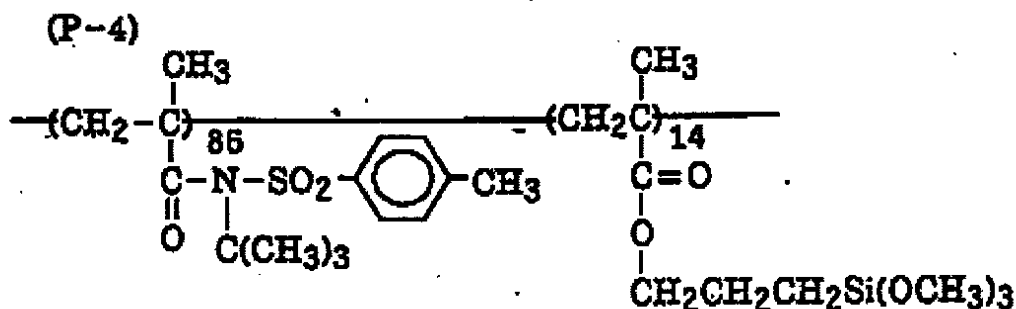
In [0070]-[0071] of the machine English translation, Kawabe teaches the polymer made of norbornene, maleic anhydride, t-butyl acrylate, and acrylic acid monomer units as his polymer having an acid-decomposable group. Therefore, the prior art teaches present invention of claim 13.

With respect to present claim 20, in [0061] of the machine English translation, Kawabe teaches applying his photosensitive composition onto a substrate. Therefore, the prior art teaches present invention of claim 20.

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3. Claims 1-4, 6, 7, 14, 17, 19, and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Kawamura et al (EP 0 814 381 A1).

Kawamura teaches (see abstract) a positive image forming composition comprising an acid generating compound and a polymer having $-\text{SO}_2\text{-NR}_3\text{-CO}-$ (a *sulfonamide group*) in which R_3 represents a tertiary alkyl group, an alkoxymethyl group, an arylmethyl group or an alicyclic alkyl group. As one of the example for the polymer, Kawamura teaches (see pg.23, lines 5-10, pg.26, lines 14-21) the following polymer;



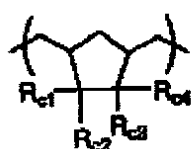
This polymer contains a silicon atom, a sulfonamide group, and a tert-butyl group (an acid labile group). Therefore, the prior art teaches present inventions of claims 1-4, 6, 7, and 14.

With respect to present claims 17, 19, and 20, Kawamura teaches (pg.33, line 56-58) papers *laminated with polyethylene, polypropylene, or polystyrene* as one of the examples for the support material to which his photosensitive composition is applied. After his photosensitive composition is coated onto a support, the photosensitive layer is exposed to a light source and then developed (see pg.34, lines 19-20, line 44-46, lines 55-58, pg.35, lines 1-6). Therefore, the prior art teaches present inventions of claims 17, 19, and 20.

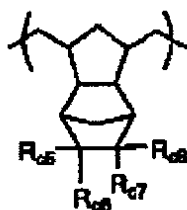
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4. Claims 1-5, 8, 14, 17, 19, and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Mizutani (JP 2001-201855, its DERWENT English abstract, and its machine-assisted English translation provided by Japan Patent Office).

Mizutani teaches (see DERWENT abstract and claim 1 of the machine English translation) a composition comprising an acid-generating compound and an acid-decomposable resin which has a repeat unit selected from the following formulae (C1) and (C2);

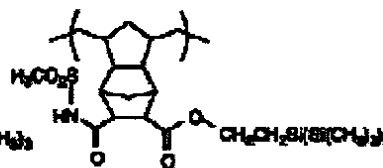
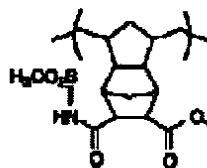
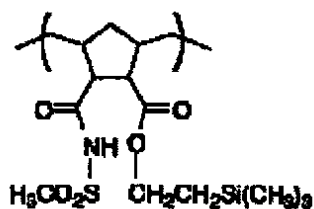


(C1)



(C2)

As examples for the repeat unit of the formula (C1) and (C2), Mizutani includes the following repeat units (see [0079]-[0083]);



Therefore, Mizutani teaches present inventions of claims 1-5 and 8.

With respect to present claims 17, 19, and 20, Mizutani teaches (see [0111] and [0113]) that after his photoresist composition is applied on a substrate, the resist film is exposed and then developed to obtain a resist pattern. Mizutani furthermore teaches that a lower layer of organic polymer membrane can be used under the upper resist

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layer made of his inventive composition to form a two-layer resist. Therefore, the prior art teaches present inventions of claims 17, 19, and 20.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over (JP 11-327145, its DERWENT English abstract, and its machine-assisted English translation provided by Japan Patent Office) in view of Park et al (5,759,755).

As discussed above in Paragraph 2, Kawabe teaches applying his photosensitive composition onto a substrate (Kawabe also teaches exposing the resist film and developing the exposed resist film in [0063], [0064], [0076]). Furthermore, Kawabe teaches (see [0061] of the machine English translation) that an antireflection film layer may exist if needed further on the substrate, but without giving details as to what kind of material can be used for the antireflection film layer. Park et al teaches making an anti-reflective layer (to be used in manufacturing a semiconductor device) made of phenol-based resin in order to eliminate the complexity of using conventional anti-reflective coating composition and reduce the production cost (see col.1, lines 12-16, col.2, lines 34-43). Since Kawabe's composition is also used in making semiconductor device (see [0001] of the English translation), and since Kawabe teaches that an antireflective film layer can further be formed on his substrate, it would have been obvious to one of

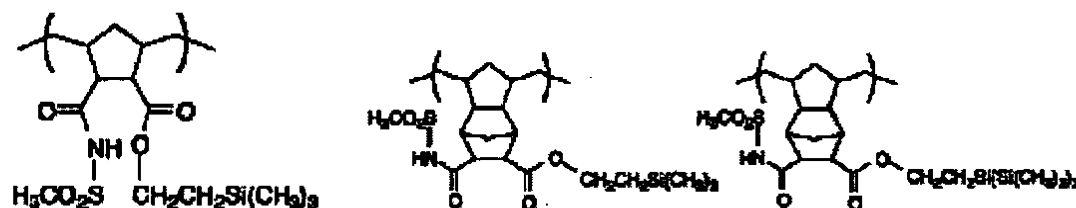
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ordinary skill in the art to form Park's anti-reflective layer made of phenol-based resin on Kawabe's substrate in order to eliminate the complexity of using conventional anti-reflective coating composition and reduce the production cost. Therefore, Kawabe in view of Park would render obvious present inventions of claims 17-19.

7. Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mizutani (JP 2001-201855, its DERWENT English abstract, and its machine-assisted English translation provided by Japan Patent Office).

Mizutani is discussed in Paragraph 4 above.

With respect to present claims 11 and 12, the following repeating units (which were discussed above in Paragraph 4)



all meet the Mizutani's generic formulae (C1) and (C2). For those three repeating units shown above, R_{C1} and R_{C5} of the generic formula (C1) and (C2) are hydrogen atoms. Mizutani teaches the equivalence of the hydrogen atoms and carboxyl groups for those variables R_{C1} and R_{C5} (see DERWENT abstract). Therefore, because the prior art teaches the equivalence of the hydrogen atom and the carboxyl group for those variables R_{C1} and R_{C5} , it would have been obvious to one of ordinary skill in the art to replace H atoms in those positions R_{C1} and R_{C5} with carboxyl groups with a reasonable expectation of obtaining a positive photoresist composition having high sensitivity and

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high resolving power in the production of a semiconductor device. Therefore, Mizutani's teaching would render obvious present inventions of claims 11 and 12.

Allowable Subject Matter

8. Claims 10, 15, and 16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

None of the cited prior arts teaches or suggests the present polymer that contains one or more Si atoms and a *distinct polymer that comprises one or more sulfonamide groups* as presently claimed in claim 10. None of the cited prior arts teaches or suggests neither the present crosslinker component of claim 15 nor the present negative-acting photoresist composition of claim 16.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sin J. Lee whose telephone number is 571-272-1333. The examiner can normally be reached on Monday-Friday from 9:00 am EST to 5:30 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark F. Huff, can be reached on 571-272-1385. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

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For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

S. Lee

S. Lee
May 28, 2004

Sin J. Lee

Sin J. Lee
Patent Examiner
Technology Center 170